

Appl. No. : 10/518,437
Filed : September 19, 2005

REMARKS

In response to the final Office Action mailed October 5, 2007, Applicant has amended the application as above. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the amendments and the remarks set forth below.

Discussion of Claim Amendments

Claim 2 has been cancelled. Claim 1 has been amended. Upon the entry of the amendments, Claims 1 and 3-15 are pending in this application. The amendments to Claim 1 are supported, for example, by original Claim 2. Thus, the amendments to the claims do not introduce any new matter. Entry of the amendments is respectfully requested.

Discussion of Rejection of Claims under 35 U.S.C. § 102(b)

Claim 1 was rejected under 35 U.S.C. § 102(b) as being anticipated by WO 99/65666 (hereinafter WO '666). Claims 1, 6 and 7 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,401,454 to Mendel (hereinafter "Mendel"). Applicant respectfully submits that Claims 1, 6 and 7 are allowable over the cited references as discussed below.

Rationale of 35 U.S.C. § 102

"For a prior art reference to anticipate a claim under 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 USPQ 2d 1315, 1317 (Fed. Cir. 1988).

Discussion of Patentability of Claims 1, 6 and 7

Independent Claim 1, as amended, recites, among other things, that one end of the channel is narrowed substantially only by two rotatable bodies to form a discharge portion. Claim 1 further recites that the relationship between the height T of the channel and the smallest gap t between the two rotatable bodies satisfies $T > 2t$, and the relationship between the radius R of at least one rotatable body and the smallest gap t satisfies $R \geq 15t$. Applicant respectfully

submits that neither WO '666 nor Mendel teaches the above-indicated features of the claimed invention as discussed below.

1. Discussion of Patentability over WO '666

WO '666 does not teach that one end of the channel is narrowed substantially *only by two rotatable bodies* to form a discharge portion. Referring to Figure 1, WO '666 discloses that the end of the channel of WO '666 is tapered where the height of the channel gradually decreases before the fluid enters rotatable bodies (3). Figure 1 of WO '666 shows that the tip of the channel is almost the same height as the minimum gap between the pair of rollers (3). That is, in WO '666, one end of the channel is not narrowed substantially only by the two rotatable bodies (3) to form a discharge portion. In contrast, in the claimed invention, one end of the channel is narrowed substantially *only by two rotatable bodies* to form a discharge portion.

Applicant notes that since the channel for discharging the molten resin of WO '666 is not narrowed substantially only by the rotatable bodies (3), the die swell of the molten resin is small and the foam-formed articles are not greatly expanded. As a result, it is difficult to produce thick foam-formed articles. Applicant further notes that the tapered channel of WO '666 also causes the laminar flow of the molten resin. Consequently, shear heat is easily generated on the surface of the channel's inner wall and between the resins, and it is difficult to precisely control the resin temperature in the inner layer.

Applicant further submits that WO '666 does not teach "the relationship between the height T of the channel and the smallest gap t between the two rotatable bodies satisfies $T > 2t$, and the relationship between the radius R of at least one rotatable body and the smallest gap t satisfies $R \geq 15t$." The Examiner acknowledged as such in this Office Action.

In one embodiment of the claimed invention, the channel satisfying the requirement of $T > 2t$ is sharply narrowed substantially only by the two rotatable bodies and the die swell of molten resin discharged from a discharge portion formed by the two rotatable bodies is large, and thick foam-formed articles can be produced. Further, the sharply narrowed form of the channel for discharging the molten resin restrains the generation of shear heat because the channel is sharply narrowed by the two rotatable bodies and the molten resins are discharged by the rotation

of the rotatable bodies. Since the molten resin is in contact with the surface of the rotatable bodies for a longer period of time, the resin temperature can be precisely controlled. Therefore, uniform and excellent foaming can be obtained. In view of the above, Applicant respectfully submits that WO '666 does not teach the above-indicated feature of the claimed invention. Since WO '666 does not teach every element of Claim 1, Applicant respectfully submits that Claim 1 is not anticipated by WO '066, and thus Claim 1 is allowable over the prior art reference.

2. Discussion of Patentability over Mendel

Mendel does not teach that one end of the channel is narrowed substantially only by two rotatable bodies *to form a discharge portion*. The Examiner indicates that in the die of Mendel, one end of the channel is narrowed by two cylindrical bars (63, 64) to form a discharge portion. Applicant respectfully disagrees. Referring to Figure 2, Mendel discloses that the discharge portion of the die is formed by a gap between an upper die lip (45) and a lower die lip (46). See the narrowed channel (gap) after the resin passes an upper adjustment (55) shown in Figure 2. That is, the cylindrical bars (63, 64) are located halfway along the channel and the gap between them does not form the discharge portion. Furthermore, in Mendel, since the upper and lower die lips (45, 46) narrow the end of the channel, one end of the channel is not narrowed substantially only by the cylindrical bars (63, 64). In contrast, in the claimed invention, one end of the channel is narrowed substantially only by two rotatable bodies to form a discharge portion. *See, for example, Figure 2 of this application*. In view of the above, Applicant respectfully submits that Mendel does not teach the above-indicated feature of the claimed invention.

Applicant further submits that Mendel does not teach "the relationship between the height T of the channel and the smallest gap t between the two rotatable bodies satisfies $T > 2t$, and the relationship between the radius R of at least one rotatable body and the smallest gap t satisfies $R \geq 15t$." The Examiner acknowledged as such in this Office Action.

Since Mendel does not teach every element of Claim 1, Applicant respectfully submits that Claim 1 is not anticipated by Mendel, and thus Claim 1 is allowable over the Mendel reference. Claims 6 and 7 depend from base Claim 1, and further define additional technical features of the present invention. In view of the patentability of their base claim, and in further

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view of their additional technical features, Applicant respectfully submits that the dependent claims are patentable over the prior art. Furthermore, Applicant does not necessarily agree with the characterizations of the prior art made by the Examiner in rejecting the dependent claims.

Discussion of Claim Rejections Under 35 U.S.C. § 103(a)

The Examiner has rejected Claim 2 under 35 U.S.C. § 103(a) as being unpatentable over WO '666 or Mendel. Claim 2 has been cancelled. The Examiner has also rejected Claims 8 and 12, 13 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Mendel in view of U.S. Patent No. 4,364,722 to Phipps (hereinafter "Phipps"). Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Mendel in view of Phipps and further in view of U.S. Patent No. 6,520,759 to Kitayama, et al. (hereinafter "Kitayama"). Applicant respectfully submits that pending Claims 8 and 12-15 are allowable over the prior art of record as discussed below.

Standard of *Prima facie* Obviousness

In order to provide a *prima facie* showing of obviousness under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Discussion of Patentability of Claims 8 and 12-15

The rejected claims (8 and 12-15) all depend from independent Claim 1. When an independent claim is patentable over the combination of the cited references, all the dependent claims thereof are patentable. Thus, now Applicant discusses the patentability of independent Claim 1 in view of the combination of the cited references.

As discussed above in connection with the § 102 rejections, neither WO '666 nor Mendel teaches the claimed features of "one end of the channel is narrowed substantially *only by two rotatable bodies* to form a discharge portion" and "the relationship between the height T of the channel and the smallest gap t between the two rotatable bodies satisfies $T > 2t$, and the relationship between the radius R of at least one rotatable body and the smallest gap t satisfies $R \geq 15t$ " recited in Claim 1.

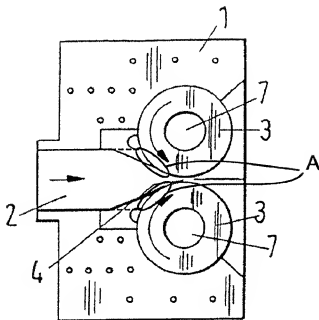
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Furthermore, Applicant respectfully submits that there is no reason or motivation to modify WO '666 so as to have a similar form to that of the claimed invention. In one embodiment of the claimed invention, in order to inhibit the generation of shear heat in the molten resin for the precise control of the resin temperature, the discharge portion for discharging the molten resin is formed by the two rotatable bodies. In contrast, in the die of WO '666, the rollers (3) are not designed to prevent the generation of shear heat during the discharge of the molten resin. The pair of rollers (3) with a central channel (7) into which a coolant is introduced is provided in the die of WO '666, because the outer layers of the molten resin are formed at an early stage by cooling so as to prevent the leakage of a blowing agent in the molten resin, and the formed outer layers are discharged without damage.

That is, the point of the die of WO '666 is to form the outer layers of the molten resin at an early stage. If the channel of the die of the prior art reference is narrowed substantially only by the rollers as in the claimed invention, the molten resin is cooled in contact with the rollers in region "A" (see the Reference Figure at the next page) to form outer layers. The formed outer layers are carried to the minimum gap portion between the rollers (3) by the rotation of the rollers (3), causing clogging of the minimum gap with the formed outer layers. In view of the above, Applicant respectfully submits that there is no reason or motivation to modify WO '666 so as to arrive at the claimed invention.

Reference Figure

Fig.1



With respect to the feature of “the relationship between the height T of the channel and the smallest gap t between the two rotatable bodies satisfies $T > 2t$, and the relationship between the radius R of at least one rotatable body and the smallest gap t satisfies $R \geq 1.5t$,” the Examiner asserts that it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the die of either WO '666 or Mendel to have the dimensional requirements because where the only difference between the prior art and the claimed invention is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device. Applicant respectfully disagrees. First, as discussed above, the claimed invention has another structural difference in addition to the above feature associated with relative dimensions. Further, WO '666 and Mendel obtain their intended purposes without considering the above specific numerical relationship between the channel and the two rotatable bodies. Thus, Applicant respectfully submits that a skilled person would not have had a reason or motivation to modify WO '666 and Mendel to have the claimed specific

numerical range. In one embodiment, the above-recited specific numerical range provides the benefit that an effective channel length is appropriately lengthened, thereby applying a sufficient pressure to the molten resin, and the internal pressure of the die can be maintained at a suitable pressure, for example, 10kg/cm^2 . See the specification age page 29, lines 13-17.

In view of the above, Applicant respectfully submits that neither WO '666 nor Mendel teaches the above-indicated features of the claimed invention. Furthermore, Applicant respectfully submits that there is no reason or motivation to modify WO '666 or Mendel so as to arrive at the claimed invention.

Phipps and Kitayama were cited merely to allegedly show certain features of dependent Claims 8 and 12-15, and these references, individually or in combination, do not remedy the deficiencies of WO '666 and Mendel. Therefore, the combination of the prior art references does not teach or suggest all of the features of independent Claim 1. In view of the above, Applicant respectfully submits that no *prima facie* case of obviousness has been established with respect to Claim 1, and thus independent Claim 1 is allowable over the prior art of record.

Claims 8 and 12-15 depend from base Claim 1, and further define additional technical features of the present invention. In view of the patentability of the base claim, and in further view of their additional technical features, Applicant respectfully submits that the dependent claims are patentable over the cited prior art.

Applicant would like to further discuss patentability of dependent Claim 8. Claim 8 recites a forming device in which the channel height of the forming device is higher than that of discharge portion. In one embodiment of the claimed invention, by providing the forming device as described above, the molten resin in a softened state is securely formed and cooled to some extent, and the formed and cooled molten resin is then taken up by a take-up unit. One embodiment of the claimed invention can provide the following advantages. The foam-formed article discharged from the foam-forming die is not always formed into a final product that has a cross-sectional shape similar to the shape of the discharge portion. For example, the cross-sectional shape of the discharged resin may sometimes be wavelike. The forming device allows the foam-formed article to be formed into a desired cross-sectional shape. In view of the

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patentability of the base claim, and in further view of their additional technical features, Applicant respectfully submits that Claim 8 is patentable over the cited prior art.

Discussion of Rejoinder for Dependent Claims 9-11

Claims 9-11 depend from base Claim 1, and further define additional technical features of the present invention. Pursuant to MPEP 821.04(b), Applicant respectfully requests that method Claims 9-11 be rejoined to the application upon allowance of the base Claim 1.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

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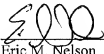
CONCLUSION

In view of Applicant's foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Respectfully submitted,

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